19.0 Tuba City, Arizona, Disposal Site

19.1 Compliance Summary

The Tuba City Disposal Site, inspected on September 10, 2003, was in excellent condition. Plant abundance on the cover and side slopes had not significantly changed since the previous inspection. Sand accumulation on the rock apron along the south toe of the disposal cell and in the drainage ditches was unchanged from last year and does not prevent these features from functioning as designed. DOE continues to evaluate long-term effects of sand accumulation and the plant encroachment, particularly growth of deep-rooted plants, on the disposal cell and rock apron. Results of ground water monitoring showed little variation from results reported in 2002. No need was identified for a follow-up or contingency inspection.

19.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Tuba City, Arizona, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I disposal site are specified in the *Long-Term Surveillance Plan for the Tuba City, Arizona, Disposal Site* (DOE/AL/62350−182, Rev. 0, U.S. Department of Energy [DOE], Albuquerque Operations Office, October 1996) and in procedures established by the DOE office at Grand Junction to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 19–1.

Table 19–1. License Requirements for the Tuba City, Arizona, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 6.1	Section 19.3.1
Follow-up or Contingency Inspections	Section 7.0	Section 19.3.2
Routine Maintenance and Repairs	Section 8.0	Section 19.3.3
Ground Water Monitoring	Section 5.2	Section 19.3.4
Corrective Action	Section 9.0	Section 19.3.5

19.3 Compliance Review

19.3.1 Annual Inspection and Report

The site, located east of Tuba City, Arizona, was inspected on September 10, 2003. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this report are shown on Figure 19–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

Many features and structures at the site, such as office buildings, evaporation ponds, water treatment plant, and a network of extraction and injection wells, are associated with active ground water remediation activities and are not described in the Long-Term Surveillance Plan. The annual inspection does not include these features or structures.

19.3.1.1 Specific Site Surveillance Features

Access Road, Fence, Gate, and Signs—A short, hard-packed and graveled road leads from U.S. Highway 160 to the entrance gate in the fence along the northern edge of the disposal site. The gate was in excellent condition. DOE secured perpetual access to the site through a Custody and Access Agreement with the Navajo Nation.

The security fence around the site is chain link with three strands of barbed wire at the top. The
19A security fence was in good condition at the time of the annual inspection. A broken bracket supporting the three strands of barbed wire was replaced prior to the inspection.

One entrance sign and 30 perimeter signs are situated around the site. All signs are on steel posts inside the fence and set back about 5 feet from the site boundary. Attached below each perimeter sign is a pictorial sign showing the disposal cell configuration. Some signs have bullet holes or dents, but all were legible.

Markers and Monuments—Two granite site markers, one near the entrance gate and the other on top of the disposal cell, were in excellent condition. One boundary monument and three combined survey/boundary monuments mark the four corners of the site. Each monument is set back at various distances from the true corners of the site boundary. Windblown sand and weeds tend to accumulate at some monument locations. All monuments were undisturbed and in excellent condition.

Monitor Wells—The seven wells of the site ground water monitoring network were found to be secure and in excellent condition.

19.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into three areas referred to as transects: (1) the disposal cell; (2) the area between the disposal cell and the site boundary; and (3) the outlying area.

Disposal Cell—The disposal cell is covered with riprap for erosion protection. The rock was in excellent condition. Inspectors discovered no evidence of slumping, settling, or instability on the top or side slopes of the disposal cell (PL–1).

Patches of dead annual weeds were seen on the top and side slopes of the cell. Only one deep-rooted woody plant (four-wing saltbush) was observed on top of the disposal cell.

For comparison purposes, photographs of vegetation cover were retaken at baseline locations on the south side slope and toe drain to document annual changes in vegetation conditions at the site. The 2003 photographs showed there was very little change in vegetation conditions from the previous inspection. DOE will continue to evaluate the effects of sand accretion and vegetation encroachment on the cover, and to assess potential impacts to the radon barrier. Vegetation management (i.e., application of herbicides) may continue to be necessary.

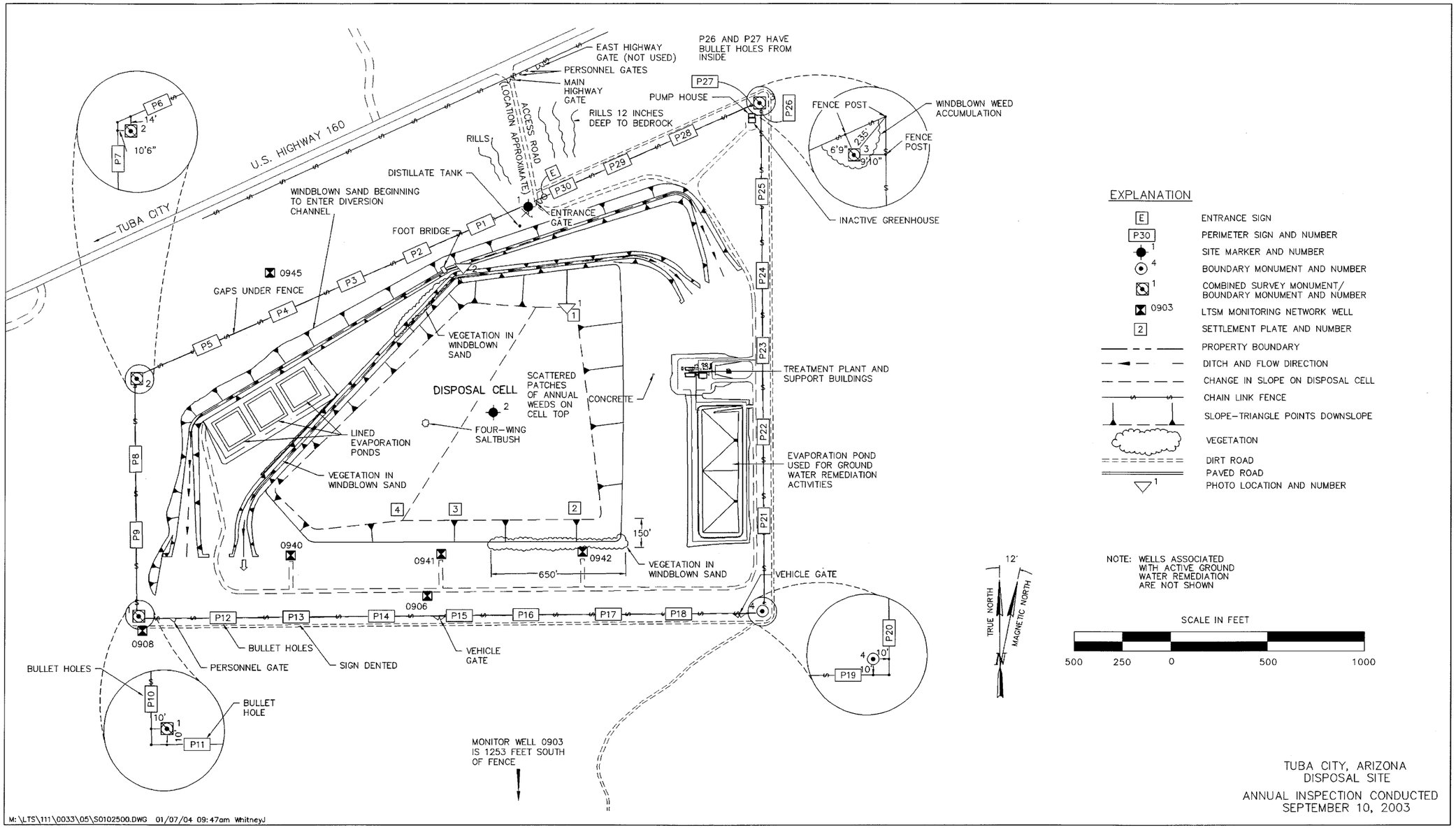

Figure 19–1. 2003 Annual Compliance Drawing for the Tuba City, Arizona, Disposal Site

Area Between the Disposal Cell and the Site Boundary—Ongoing ground water remediation activities continue to disturb small portions of the area between the disposal cell and the site boundary. Revegetation of these areas is slow but progressing. Inspectors will continue to monitor revegetation to ensure the existing vegetative cover is not further degraded by on-site activities. In general, the vegetation conditions on site are comparable to the vegetation conditions of the adjacent land off site.

Another ongoing issue at the site is tumbleweed (dead Russian thistle) and sand accumulation along the fence lines. Tumbleweeds tend to accumulate along the west and northeast portions of the perimeter fence, and sand tends to accumulate along the western fence line. At the time of the 2003 inspection, tumbleweed and sand accumulation was insignificant.

Two rock-lined drainage channels are located on the north (upslope) side of the disposal cell. The outermost channel intercepts storm water and diverts it around the disposal cell to the south and east. The inner drainage channel, constructed at the toe of the north and northwest sides of the disposal cell, collects runoff from the disposal cell itself and diverts it to the south and east as well. Sand accumulation in the inner diversion channel and in the northwest segment of the outer diversion channel was unchanged since the 2002 inspection and does not interfere with the drainage function of the channels (PL–2).

Outlying Area—The area beyond the site boundary for a distance of 0.25 mile was visually inspected. No erosion or new development, with the exception of ground water remediation activities, was noted.

19.3.2 Follow-Up or Contingency Inspections

No follow-up or contingency inspections were required in 2003.

19.3.3 Routine Maintenance and Repairs

A bracket on the security fence was replaced prior to the 2003 inspection.

19.3.4 Ground Water Monitoring

DOE monitors ground water to compare current conditions to baseline water quality. This
19B monitoring will not be indicative of disposal cell performance because baseline (background) water quality is degraded by contamination from former milling activities that likely will mask contamination that might leach from the disposal cell.

In accordance with the Long-Term Surveillance Plan, seven wells (Table 19–2) are monitored for four target analytes—molybdenum, nitrate, selenium, and uranium. In 40 CFR 192 Table 1 of Subpart A, the U.S. Environmental Protection Agency has established maximum concentration limits for these analytes in ground water. These limits are 0.1 milligrams per liter (mg/L) for molybdenum, 44 mg/L for nitrate (as NO_3), 0.01 mg/L for selenium, and 0.044 mg/L for uranium. Time-concentration plots, beginning in 1995, for the four analytes are shown on Figures 19−2 through 19−5.

Table 19–2. Ground Water Monitoring Network at the Tuba City, Arizona, Disposal Site

Monitor Well	Hydrologic Relationship
MW−0903	Downgradient, off site
MW−0906	Downgradient, baseline
MW−0908	Downgradient, baseline
MW−0940	Downgradient, disposal cell boundary
MW−0941	Downgradient, disposal cell boundary
MW−0942	Downgradient, disposal cell boundary
MW−0945	Upgradient, baseline (background)

Sample results from 2003 indicate that ground water quality downgradient of the former millsite is degraded with respect to all four target analytes. Ground water quality did not change significantly between 2002 and 2003.

Molybdenum concentrations exceeded the 0.1 milligram per liter (mg/L) standard in the sample from monitor well MW−0941 in 2003. Except at MW–0906, molybdenum concentrations have not varied significantly in the last 8 years (Figure 19–2). Samples from MW−0906 typically have had higher and more variable molybdenum concentrations in the past than samples from other wells.

In 2003, concentrations of nitrate (as NO_3) exceeded the 44 mg/L standard in samples from all monitor wells except background well MW−0945. Between 2002 and 2003, no significant increases or decreases in concentrations were observed in samples from any well, although concentrations varied considerably—by more than two orders of magnitude—from well to well (Figure 19–3).

Consistent with historical data, selenium concentrations exceeded the 0.01 mg/L standard in 2003 in samples from all wells except background well MW−0945 and off-site, downgradient well MW−0903. Selenium values have remained fairly consistent in samples from all wells except MW−0906 and MW−0940 (Figure 19–4).

Uranium concentrations exceeded the 0.044 mg/L standard in 2003 samples from all wells except background well MW−0945 and off-site, downgradient well MW−0903. Concentrations have remained fairly constant over time in samples from all wells except MW−0906 and MW−0940 (Figure 19−5).

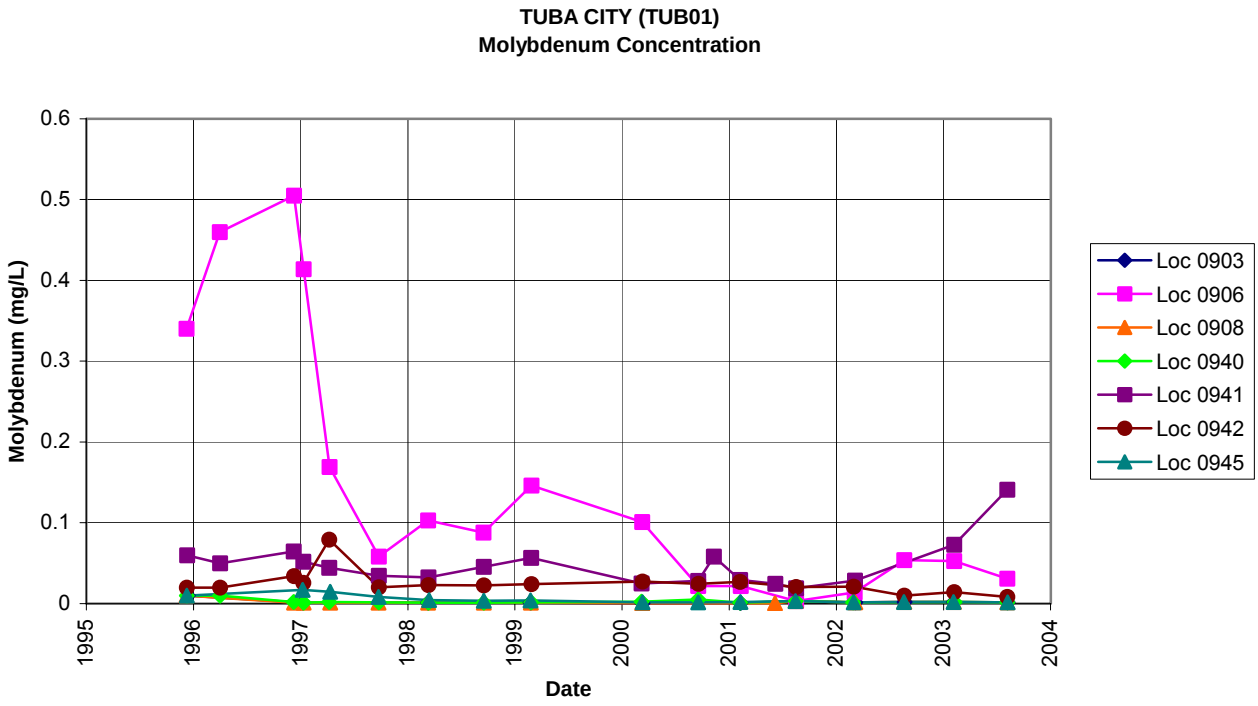

Figure 19–2. Time-Concentration Plots of Molybdenum in Ground Water at the Tuba City, Arizona, Disposal Site

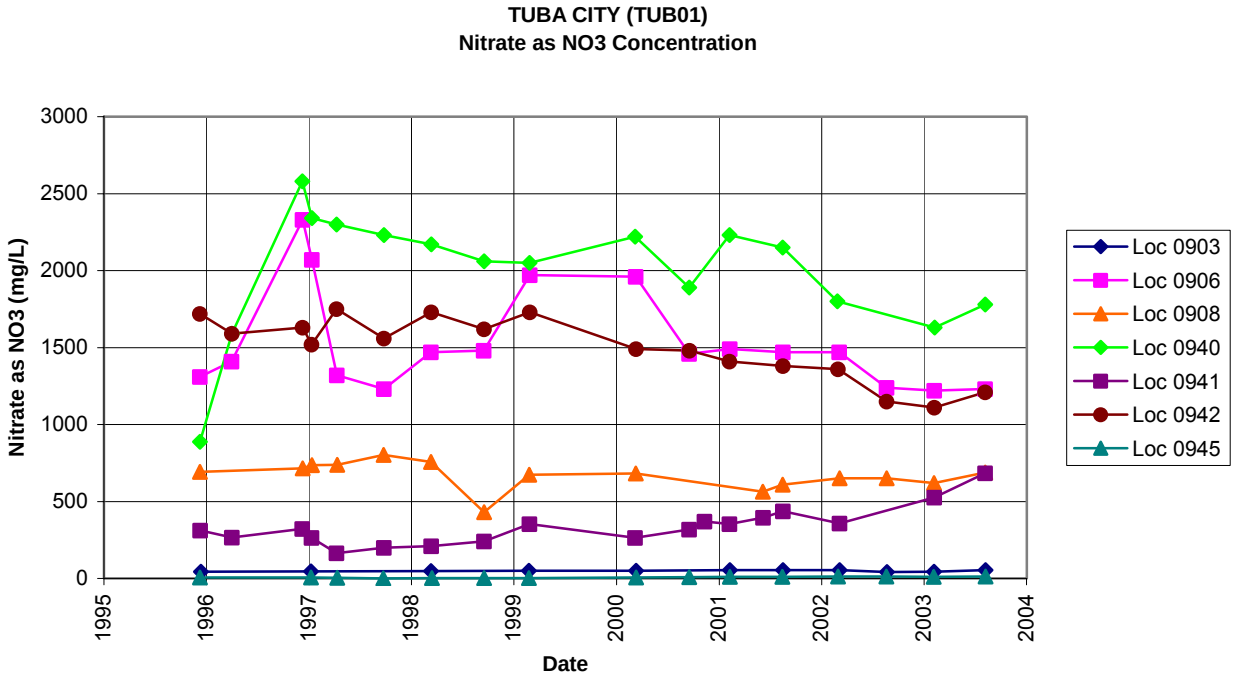

Figure 19–3. Time-Concentration Plots of Nitrate (as NO_3) in Ground Water at the Tuba City, Arizona, Disposal Site

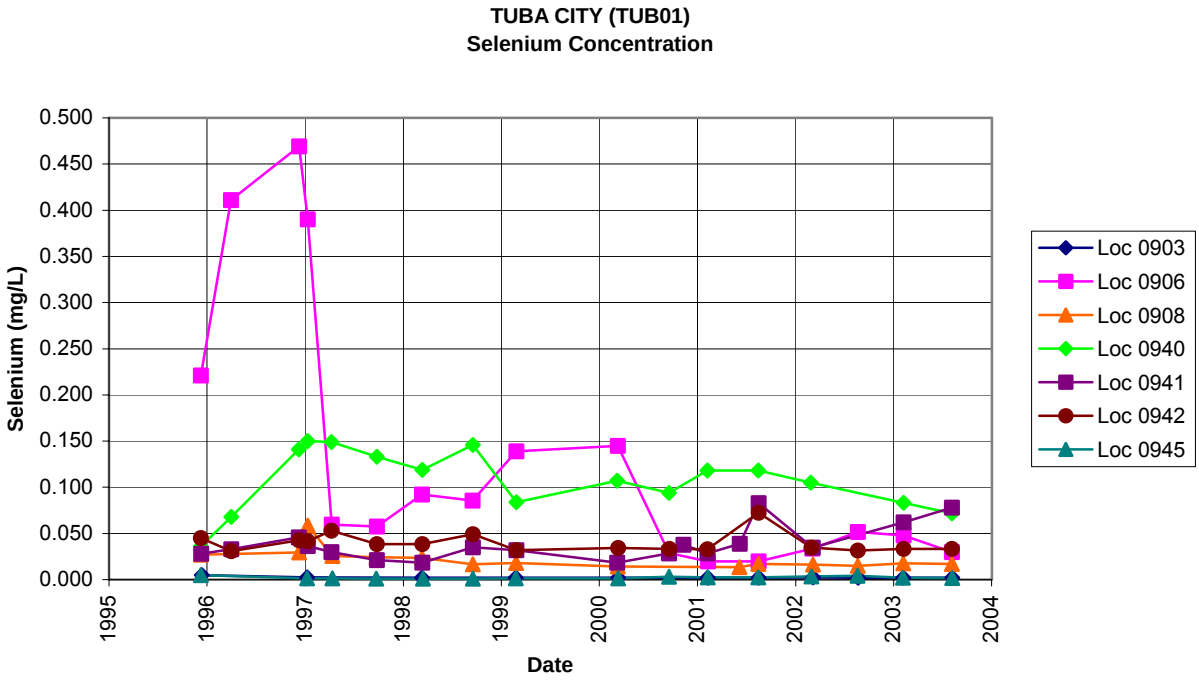

Figure 19–4. Time-Concentration Plots of Selenium in Ground Water at the Tuba City, Arizona, Disposal Site

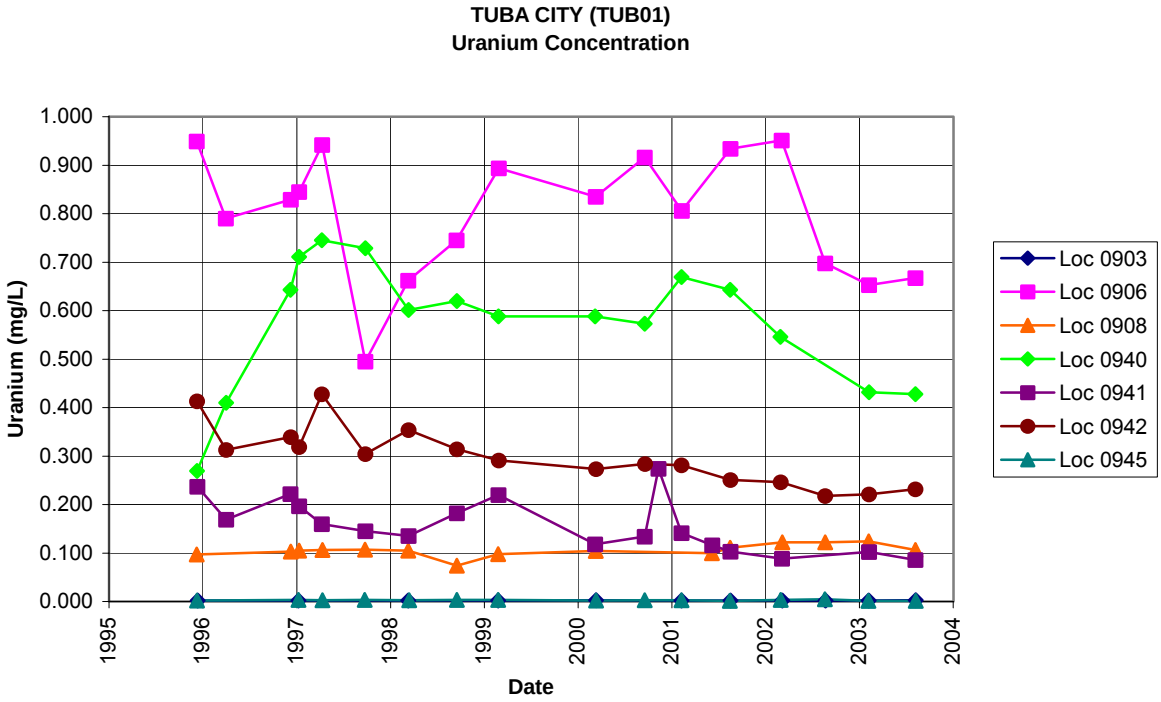

Figure 19–5. Time-Concentration Plots of Uranium in Ground Water at the Tuba City, Arizona, Disposal Site

19.3.5 Corrective Action

Corrective action is action taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

No corrective action was required in 2003.

19.3.6 Photographs

Table 19–3. Photographs Taken at the Tuba City, Arizona, Disposal Site

Photograph Location Number	Azimuth	Description
PL–1	135	East side slope of the cell and adjacent ground water remediation facilities.
PL–2	240	Sand accumulation and vegetation between the toe drainage channel (left) and the storm water diversion channel (right).

TUB 9/2003. PL–1. East side slope of the cell and adjacent ground water remediation facilities.

TUB 9/2003. PL–2. Sand accumulation and vegetation between the toe drainage channel (left) and the storm water diversion channel (right).